

- (a) to provide a trailer that may be enclosed for storage whose dimensions will allow for manageable size.
- (b) to provide a collapsible trailer whose bed is not restricted to specific cargo items.
- (c) to provide a collapsible trailer whose towing vehicle is not restrained to a specific class.
- (d) to provide a collapsible trailer whose bed is capable of sustaining great weights.
- (e) to provide a trailer which is both portable in the stowed position and unoppressive when handled by its operator throughout the duration of the storage preparations.
- (f) to provide a trailer, which may be classified as an all-purpose utility trailer yet, can be collapsed for storage.
- (g) to provide a collapsible utility trailer whose production allows for a convenient and extremely rapid open position and closed positioning when employed by its operator.
- (h) to provide a trailer which will not require a detachment or removal of various parts in order to attain the stowage position.

[0012] Further objects and advantages are to provide a collapsible utility trailer bed, which can be folded easily and conveniently without disarrangement of the bed, and devoid of substantial learning necessary on the part of the consumer. The present invention obviates the need to disassemble or rearrange the trailer, which contributes to its speed and general ease of use. Further objects and advantages of the invention will become apparent from a consideration of the drawings and ensuing description.

SUMMARY

[0013] Generally, speaking, in accordance with the present invention, the collapsible trailer comprises a platform having a first and second longitudinal section hingeably mounted to a third central section. The platform is pivotable between an open position, wherein the



62B. rear spring hanger	64A. cylindrical flange
64B. cylindrical flange	66. axle
68. spring mounting bracket	70. hub
72. stationary section	74A. aperture
74B. aperture	75. point on arm
78. point on stationary section	80. central kingpin
82. left second arm	84. right first arm
88. "L" shaped flange	90. aperture
92A. aperture	92B. aperture
94A. bolt	94B. bolt
96. aperture	98. kingpin
100. rectangular flange	102. mounting bracket
104. aperture	106A. aperture
106B. aperture	108A. aperture
108B. aperture	110A. bolt
110B. bolt	112A. pulley
112B. pulley	114. cable
116. winch	120. hitch
122. hinge	

DETAILED DESCRIPTION-PREFERRED EMBODIMENT

[0021] Referring to the Figures and in particular to FIG. 1, the trailer **10** comprises a platform **11** made up of a pair of longitudinal sections hingeably mounted about a third central axial section **20**. Steel tubing may be employed for construction of the trailer sections and is the preferred material of the embodiment. A rear flange **22** is employed to hold the platform parallel during utility and is mounted horizontally to the distal end of the central section so that the ends of the flange may protrude past the width of the central section.

A frontal flange **16** is adapted to contain two right and left apertures **18R** and **18L** and permit manual insertion of locking pins **12A** and **12B** through said flange and extending through the aligned apertures **24R** and **24L** of the central section **20**. As illustrated in Figures 1,2, and 6, the front flange is additionally welded to a hitch **120** and is exercised to hold said hitch in an upright manner when said pair of locking pins affixed with their respective corresponding standard chains **13A** and **13B**, attached to said flange **16**, are inserted through these corresponding apertures. In addition, a frontal hinge **122** is coupled by welding to both the hitch **120** and the proximal end of the central section **20**. When the collapsible trailer is in the open (unfolded) position the flange **16** will reside atop central section **20** with this section disposed substantially between flange **16** and the hinge **122** as illustrated in FIG. 6. By incorporating such an assembly, trailer **10** is alleviated in the action of retaining the platform substantially parallel in its' load carrying position.

[0022] As illustrated in Figures 1 and 6, and specifically to FIG. 2, a set of longitudinal lateral sections **28** and **30** are constructed rectangularly of steel tubing and are considerably wider than said axial section **20** of the preferred embodiment. A pair of section hinges **26R** and **26L** are located proximately to the interior edges of lateral sections **28** and **30** sandwiched between central section **20** and are affixed by welding; thereby connecting sections **28** and **30** to section **20**. The first and second hinge members **26L** and **26R** comprise a means for pivotally coupling the first and second sections **28,30** to the axial section **20**. Section hinges **26L** and **26R** are affixed in such a fashion that, when coupled, the lateral sections **28** and **30** will point downwardly at an angle curtailed of 180 degrees, thus facilitating an easier folding of the platform **11**. The first and second hinge members **26R** and **26L** permit the first and second sections **28,30** to be rotated relative to one another to allow the first and second sections assume 1) an open position wherein the first outer edge **48** is distal from the second outer edge **50** and the upper surfaces of the first, second, and third sections **28,30**, and **20** are substantially co-planar (as viewed in FIG. 1) and 2) a closed position wherein the first outer edge **48** is moved immediately closer and

parallel to said second outer edge with the third axial section **20** disposed therebetween.
(as shown in FIG. 2)

[0023] As shown in FIG. 1, an identical pair of cylindrical flanges **64A** and **64B** are welded ventrally to the distal ends of the sections **28** and **30**. These flanges are composed of standardized structural steel and are placed precisely adjacent to hinges **26L** and **26R**. As the trailer platform **11** collapses, the flanges **64A** and **64B** are unable to impede the movement of the hinges **26L** and **26R** but are able to procure a stopping point for the first and second sections **28** and **30**, as flanges **64A** and **64B**, are abutting against central section **20**. Figure 2, which illustrates a plan view of the collapsible trailer in the folded position, displays that the first **28**, second **30**, and third **20**, sections of the trailer bed form an enclosure which is of a generally trapezoidal stowage form for ease in storage and handling. Again, at the rear end of the sections **28,30** a set of support members **44** and **46** are engaged to act as stops are welded to each said inner edge corner of these sections, and protruding externally to lie flush with the distal end of rear flange **22**. Furthermore, these said support members act in consort with the rear flange **22** to stabilize the platform **11** in a parallel, load-bearing position during trailer use.

[0024] Referring again to FIG. 1 each lateral longitudinal section of the trailer assembly is provided with a pair corresponding floor supports **28A**, **28B**, **30A**, and **30B** welded atop each section **28**, **30** at the locations **32**, **34**, **36**, and **38**. These floor support members extend downwardly from the underside of the flooring and function to provide additional structural integrity to platform **11**. Flooring for this trailer bed is not considered to fall within the scope of this disclosure; however the choice would be left to the manufacturer of the device.

[0025] As viewed in FIG. 1, a first and second suspension means are illustrated regarding the trailer in its expanded configuration. Located at the exterior edges of the first and second lateral section **48** and **50**, the suspension means for the trailer is comprised of:

rotating suspension joints **52R** and **52L**, a "double" first and second leaf spring, **56** and their respective spring hangers **62A** and **62B**. As viewed in the frontal view of a singular axle assembly as seen in FIG. 3, the suspension joint **52R** is comprised of steel tubing which has been configured for an insertable, telescopic fit around the exterior, circular edge of the right bed section **28**. The dual set of suspension joints **52R** and **52L** are disposed on transverse relation to floor supports **28A**, **28B**, **30A**, and **30B** of each lateral section. As viewed in FIG. 1 of the instant invention, the suspension joints **52R** and **52L** are constructed to be fixed flush between the floor support members and the first and second bed sections, thereby preventing said suspension joint a non-actuated progression outside the floor support members.

[0026] A key feature of the present invention is the means by which the axle assemblies are pivotable between stowed and open positions without need of disassembly, subsequently obviating detachment or tool usage by its operator. In the preferred embodiment of the invention, the trailer utilizes a straight axle design, adapted to and modified from its' original construction as a common axle joining one wheel to the other. In the preferred embodiment the first and second stationary sections of the axle are comprised of a straight axle type commonly chosen to be affixed in a relation disposed beneath the leaf springs. Those skilled in the art should find it apparent that the remaining constituent elements connected to the said axle assemblies; including the leaf springs in combination with their spring brackets, wheel assemblies and their hubs, are comprised of typical conventional components of general vehicular/trailer use and are readily available.

[0027] As singularly illustrated in Figures 3 and 4, the first axle assembly means is comprised of three main elements: a first wheel assembly combined with a hub **70**, a stationary section of the axle **72** and a collapsible arm **84**. The stationary section is comprised of a square hollow tube which in turn, a leaf spring **56** may be bracketed to the center of said section **72** of the axle. Secondly, the leaf spring is then attached to the tubing **60** of the rotating

suspension joint via its respective spring hangers **62A** and **62B**. The basal location of the leaf spring **56** is then bolted by means of a standard mounting bracket **68** to section **72** of the axle. Referring to FIGS. 3 and 4, the hub **70** and wheel suspension means, upon which the wheel (not shown) is to be bolted resides at the distal end of the stationary axle section **72**. As represented in FIG. 5, directly upon area **78** at section **72** is a perpendicularly mounted central kingpin **80**, which in turn passes through the axle assembly at section **72**, referring to the exploded view of FIG. 5., first **84** and second **82** collapsible arms each include an identical aperture **86**, at their distal ends and an additional pair of identical smaller apertures **74A** and **74B**, located at point **75**, respectively. The first and second arms **84** and **82** are made up of solid, elongated steel, each arm having a length approximately equal to two-thirds platform **11** width. It should be noted that the platform width is calculated by utilizing both sections **28** and **30** and the central section **20** combined. The distal ends of each arm **82** and **84** connect central kingpin **80** within the stationary sections **72** of each axle assembly by passing through an aperture **86**. Each arm **82** and **84** have a bolted "L" shaped flange **88** containing identical corresponding apertures **90** at their proximal ends and also have two smaller identical apertures **92A** and **92B** located at the base end of this flange **88**.

[0028] Referring again to FIG 5, the flange **88** is mounted by two varied means at two different locations. It is permanently coupled at the proximal end of the flange by utilizing a corresponding bolt pair **94A** and **94B**, which are inserted through apertures **74A** and **74B** upon the said first and second arms, terminating through apertures **92A** and **92B** upon said flange. Secondly, the "L" shaped flange is pivotally mounted at its distal end by first inserting kingpin **80** through aperture **86** then ending at aperture **90** located distally upon flange **88**.

[0029] Located at the frontal end of the right arm **84**, an aperture **96** permits the insertion of a kingpin **98**. This kingpin is mounted on a rectangular flange **100** projecting from the base

of said left arm. In addition, a mounting bracket **102** comprised of solid metal contains an aperture **104** and pair of aligned, smaller apertures **106A** and **106B** as seen in FIG. 5. Aperture **104** receives the kingpin **98** and thus bracket **102** affixes to the left second arm **82** using bolts **110A** and **110B** through corresponding apertures **106A** and **106B** and finishing within apertures **108A** and **108B** located upon the frontal end of the left arm **82**.

[0030] As shown in FIG 3, which is a frontal view of axle assembly, the inventor has included a pair of pulleys **112A** and **112B** to be connected by welding at the interior hollow areas of each stationary axle section **72**. As illustrated in FIGS. 1 and 2 a cable **114** is joined with a conventional winch **116** at its proximal end. Conversely, the said cable is affixed to a stationary section **72** by means of an aperture **118**, illustrated in FIG 5, located at the distal end of the cable **114**. The cable is then threaded through the pulleys in a standard “block and tackle” formation. Referring to FIG. 6, a winch **116** is mounted to the approximate midsection point of a standard hitch **120**.

Operation—Figures 1, 2, and 6

[0031] Operation of the trailer will now be discussed in connection with FIGS. 1, 2, and 6 beginning with storage of the trailer as shown in FIG. 2. The trailer **10** is stored in the collapsed position horizontally to attain the stowage position in a trapezoidal shape. The rotating suspension joints **52R** and **52L** and the collapsible arms **82** and **84** each work in consort to retain the stationary sections **72** of the axle assembly in their respective perpendicular and parallel planes, be they in stowed or open configuration. Furthermore, the trailer **10** need not be supported by any other devices such as casters, support beams, or the like, but will be maintained by its’ own permanently coupled axle assembly: a feature not provided for in the prior art.

[0032] In addition, a substantial conservation of space is provided in this folded position.

When the collapsible trailer **10** is moved into its storage position as illustrated at FIG. 2, the trailer is only approximately thirty-six inches high and less than 36 inches deep: varying measurements of width and height being only applicable accordingly with the tires (not shown) chosen by the manufacturer of the device.

[0033] To utilize trailer **10**, the device is rolled from storage and the hitch **120** is raised in the direction of arrow A of FIG. 6 so that the hitch is rotated to an approximately ninety-degree angle. As illustrated in FIG. 2 pin set **12A** and **12B** are inserted through the front flange **16** through corresponding apertures **18R** and **18L** ending through apertures **24R** and **24L** (not shown) of the third central axial section **20**. Winch **116** is then manipulated to sufficiently release the tension of cable **114**, thereby affording opportunity of platform **11** to unfold downwardly. Secondly the operator need only grapple the wheel (not shown) or an outer edge of either lateral section **48** or **50** and draw directly away from the center section **20** in order to direct trailer **10** to its load bearing, utility position as illustrated in FIG. 1. First and second arms **82** and **84** expand to retain the hubs **70** in their respective perpendicular planes during which rotating suspension joints **52** and **54** permit lateral sections **28** and **30** to rotate vertically within tubing **60** to a descent appropriate for utility. By the same accord, section hinges **26R** and **26L** flex to allow the sections **28** and **30** to move to an extreme open position, abutting rear flange **22**, at central section **20**, wherein the surfaces of adjoining sections **20**, **28**, and **30** are substantially coplanar and ready for use, as illustrated in FIG. 1.

[0034] Referring to FIG. 2 and 6, in order to fold trailer **10**, the operator need only crank winch **116**, mounted to a standard hitch **120**, resulting subsequently in a drawing of a cable **114** applying a taut force to the previously noted "block and tackle" formation comprised of pulleys **112A** and **112B**. This motion will result in sufficient pressure required to draw axle sections **72**, to a side by side proximity. At the same intervening time, collapsible arms **82** and **84** are compressed to permit movement of hubs **70**, and their corresponding stationary sections **72**, respectively.

[0035] It should be noted that the inventor has stipulated that section hinges **26R** and **26L** be affixed in such a manner as to allow both sections **28** and **30** to point downwardly at an angle of approximately 175 degrees, thus ensuring that an upward ascent of force will be employed when drawing cable **114**. In construction it has been found that if section hinges **26R** and **26L** were joined to said first and second sections **28** and **30** and thereby retaining the platform **11** in a coplanar horizontal angle of 180 degrees would subsequently render undesirable force to the outer edge of said central section **20** of trailer **10**. The cable **114** when drawn would apply considerable pressure to the exterior central section **20** and would therefore be unable to engage hinges **26R** and **26L**, and consequently be unable to permit movement of lateral sections **28** and **30**.

[0036] As the arms **82** and **84** are compressed, axial section **20** ascends as rotating suspension joints **52R** and **52L** allow sections **28** and **30** movement via tubing **60** to a suitable position for trailer **10** stowage position as seen in FIG. 2. Cylindrical flanges **64A** and **64B** abut central section **20**, thus stopping first and second sections **28** and **30** as they travel to the storage position. Referring to FIGS. 2 and 6 the operator then removes pins **12A** and **12B** from front flange **16** and lowers hitch **120**. Trailer **10** may then be readied for stowage by wheeling the unit to its desired storage area, garage, or the like.

Conclusions, Ramifications, and Scope

[0037] Thus the reader will see that the collapsible integrant of the trailer provides a highly reliable, easily storable, yet convenient and durable platform which may be quickly and easily collapsed for storage. Furthermore the trailer has additional advantages in that

- . it permits the production of collapsible trailers in a variety of sizes whose platform is capable of sustaining great weights;
- . it allows the trailer to be collapsed for storage without the need to detach various panels, wheel assemblies, or the like and consequently sacrifice ease of use by a consumer; and

. it provides a trailer with a superior platform upon which one may transport cargo items of ponderous size yet whose platform is able to provide a substantial conservation of space when stowed.

[0038] While the above description contains much specificity, these should not be construed as limitations on the application of the invention, but rather as an illustration by example of one preferred embodiment thereof. Several other variations are possible. For example, the above embodiment utilizes two longitudinal sections hingely mounted to a third central section. This is by of means example and the invention functions equally as well utilizing as few as two sections without the third central section. Additionally, the collapsible trailer may also be constructed as a doubled or tripled axle design in consort with their respective arms, not just a single axle design used by way of example. Lastly, the trailer may be easily converted to accommodate ramps or a back gate providing these are affixed sectionaly so as not to impede operation of the embodiment.

[0039] It will be accordingly seen that the objects stated forth above, among those made apparent from the preceding description, are attained and, since particular alterations may be made to the above description without departing from the scope of the invention, it is intended that all matter within the above description or illustrated in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

[0040] It is also understood that the scope of the invention should be determined not only by the embodiment as illustrated but the appended claims and their legal equivalents.